

Amendments to the Claims

This listing of the claims will replace all prior versions, and listings, of the claims in the application:

Listing of the Claims

1. (currently amended) A method for analyzing an image, the method comprising the steps of:

receiving data representing a plurality of elements of an image;

characterizing each element in the plurality of elements according to a perceived characteristic including a characteristic corresponding to an edge; and

identifying each element having a given characteristic that is adjacent an element having a characteristic approximately the same as the given characteristic.

2. (original) The method of claim 1 wherein the step of receiving data includes the step of receiving data from a memory location.

3. (original) The method of claim 1 wherein the step of characterizing includes the step of characterizing a plurality of pixels representing an image.

4. (original) The method of claim 3 wherein the step of characterizing includes the step of identifying pixels representing background.

5. (original) The method of claim 3 wherein the step of characterizing includes the step of identifying pixels representing black information.

6. (original) The method of claim 3 wherein the step of characterizing includes the step of identifying pixels representing color information.

7. Canceled.

8. (original) The method of claim 1 wherein the step of characterizing includes the step of evaluating a luminance value for a pixel and comparing the luminance value to a number.

9. (original) The method of claim 8 wherein the step of evaluating a luminance value includes the step of comparing the luminance value to a number representing a white threshold.

10. (original) The method of claim 8 wherein the step of evaluating a luminance value includes the step of comparing the luminance value to a number representing a black threshold.

11. (original) The method of claim 8 wherein the step of evaluating a luminance value includes the step of assigning to the pixel a representation of either one of black, white or gray.

12. (original) The method of claim 8 wherein the step of evaluating a luminance value includes the step of assigning to the pixel a representation of either one of black, white or color.

13. (original) The method of claim 1 wherein the step of identifying each element that is adjacent includes the step of identifying each element that is adjacent an element having the given characteristic.

14. (original) The method of claim 1 wherein the step of identifying each element that is adjacent includes the step of using an eight-neighbors system.

15. (original) The method of claim 1 wherein the step of identifying each element that is adjacent includes the step of identifying adjacent pixels that are background pixels.

16. (original) The method of claim 1 wherein the step of identifying each element that is adjacent includes the step of identifying adjacent pixels that are non-background pixels.

17. (original) The method of claim 1 wherein the step of identifying each element that is adjacent includes the step of identifying adjacent pixels that are characterized as either one of black, gray, gray edge, color, color edge, or white.

18. (original) The method of claim 1 wherein the step of identifying each element that is adjacent includes the step of identifying adjacent pixels that are characterized as background, and further including the step of identifying adjacent pixels characterized as background and also characterized with a label.

19. (original) The method of claim 1 wherein the step of identifying each element that is adjacent includes the step of identifying adjacent pixels that are characterized as non-background, and further including the step of identifying adjacent pixels characterized as non-background and also characterized with a label.

20. (original) The method of claim 19 wherein the step of identifying pixels with a label include the step of identifying pixels labeled one of edge, color, gray, and black.

21. (original) The method of claim 19 further comprising the step of determining if the number of non-background pixels having a given label and that are adjacent are less than or greater than a given number.

22. (original) A method of processing elements in an image, the method comprising the steps of:

receiving a plurality of elements in an image;

identifying elements of the plurality of elements of the image that represent an edge of a portion of the image; and

identifying elements of the image that represent an edge and that are adjacent at least one other element representing an edge.

23. (original) The method of claim 22 wherein the step of identifying elements of the image representing an edge includes the step of using a gradient operation on groups of pixels to determine if an individual pixel is part of an edge.

24. (original) The method of claim 22 wherein the step of identifying elements of the image that represent an edge and that are adjacent includes the step of selecting a first pixel that represents an edge, and identifying a plurality of adjacent pixels, and identifying any of the plurality of adjacent pixels that represent an edge.

25. (original) The method of claim 24 wherein the step of identifying a plurality of adjacent pixels includes the step of identifying pixels that are the next pixel away from the first pixel.

26. (original) The method of claim 24 wherein the step of identifying a plurality of adjacent pixels includes the step of identifying pixels according to the eight-neighbors system.

27. (original) The method of claim 24 wherein the step of identifying any of the plurality of adjacent pixels that represent an edge includes the step of labeling the adjacent pixels that represent an edge with a unique label.

28. (original) The method of claim 24 wherein the step of identifying any of the plurality of adjacent pixels that represent an edge includes the step of identifying pixels representing an edge that are adjacent at least two other pixels representing an edge.

29. (original) The method of claim 24 further comprising the step of identifying pixels representing substantially the same image characteristic.

30. (original) The method of claim 29 wherein the step of identifying pixels representing substantially the same image characteristic includes the step of identifying pixels having a label corresponding to the same characteristic of one of color, gray, or black.

31. (original) The method of the claim 30 further comprising the step of identifying pixels having the same label and that are connected to one another.

32. (original) The method of claim 31 wherein the step of identifying pixels that are connected includes the step of identifying pixels having the same label that are connected through other pixels having the same label.

33. (original) The method of claim 32 wherein the step of identifying pixels having the same label that are connected includes the step of applying a sub-label to the connected pixels that have the same label.

34. (original) The method of claim 29 further comprising the step of identifying pixels having substantially the same image characteristic and that are interconnected.

35. (original) The method of claim 34 further comprising the step of applying a unique sub-label to the inter-connected pixels having the same image characteristic.

36. (original) The method of claim 34 further comprising the step of determining the number of interconnected pixels having substantially the same image characteristic.

37. (original) The method of claim 36 wherein the image characteristic is a first image characteristic, and further comprising the step of determining the number of interconnected pixels that have a second image characteristic and comparing it to the number of pixels having the first image characteristic.

38. (original) The method of claim 37 further comprising the step of identifying pixels having the first image characteristic and that are adjacent to pixels having the second image characteristic.

39. (original) The method of claim 37 further comprising the step of changing the pixels having the second image characteristic to an image characteristic closer to the first image characteristic.

40. (original) The method of claim 39 wherein the step of changing includes the step of changing a numeric value for the pixels having the second image characteristic by multiplying the numeric value by a number less than one.

41. (original) The method of claim 39 wherein the step of changing includes the step of changing a numeric value for the pixels having the second image characteristic to an average of a numeric value for the pixels having the first image characteristic.

42. (original) The method of claim 37 wherein the first image characteristic is black and the second image characteristic is other than black.

43. (original) The method of claim 42 further comprising the step of counting the number of non-black pixels that are interconnected and comparing to the number of interconnected black pixels.

44. (original) A method of processing elements in an image, the method comprising the steps of:

receiving a plurality of elements in an image;

characterizing each element in the plurality of elements according to a perceived characteristic;

identifying each element having a characteristic representing background that is adjacent an element having a characteristic also representing background;

identifying elements of the plurality of elements of the image that represent an edge of a portion of the image; and

identifying elements of the image that represent an edge and that are adjacent at least one other element representing an edge.

45. (new) The method of claim 44 further including identifying elements of the plurality of elements of the image that represent black.

46. (new) The method of claim 44 further including identifying elements of the plurality of elements of the image that represent one of gray and gray edge.

47. (new) The method of claim 44 wherein identifying elements of the plurality of elements of the image that represent an edge of a portion of the image include identifying elements that represent one of a white edge, gray edge, and color edge.

48. (new) The method of claim 44 further including assigning a label to each element and further including assigning pointers, and wherein a first pointer assigned to an element having a first label is also assigned to an adjacent element having the first label.

49. (new) The method of claim 44 wherein identifying elements of the image that represent an edge includes identifying elements of an image representing an edge using a gradient operation.

50. (new) A method for analyzing an image, the method comprising:
receiving data representing a plurality of elements of an image wherein the data includes grayscale image data;

characterizing, as a function of the grayscale image data, elements in the plurality of elements according to a perceived characteristic wherein a perceived characteristic includes an edge characteristic; and

identifying each element having a given characteristic that is adjacent an element having a characteristic approximately the same as the given characteristic.

51. (new) The method of claim 50 further including identifying, as a function of the grayscale image data, elements of the plurality of elements of the image that represent black.

52. (new) The method of claim 50 further including identifying elements of the plurality of elements of the image that represent one of gray and gray edge.

53. (new) The method of claim 50 wherein identifying elements of the plurality of elements of the image that represent an edge of a portion of the image include identifying elements that represent one of a white edge, gray edge, and color edge.

54. (new) The method of claim 50 further including assigning a label to each element and further including assigning pointers, and wherein a first pointer assigned to an element having a first label is also assigned to an adjacent element having the first label.

55. (new) The method of claim 50 wherein identifying elements of the image that represent an edge includes identifying elements of an image representing an edge using a gradient operation.

56. (new) The method of claim 50 further including identifying adjacent image elements that represent an edge and labeling the adjacent image elements that represent an edge with a unique label.

57. (new) The method of claim 50 wherein the perceived characteristic is a first image characteristic, and further including determining the number of interconnected image elements that have a second image characteristic and comparing it to the number of image elements having the first image characteristic.

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